

Focus on Friction

Lesson at a glance:

Students will conduct an investigation to compare how a variety of objects move down a ramp at different rates of speed depending on the amount of friction there is between the object and the ramp.

Skills:

Investigating, Predicting, Measuring, Observing, Identifying, Questioning, Communicating

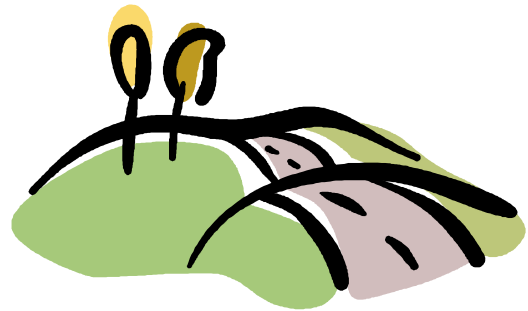
Grades:

3-5

Materials:

For each group of students:

- A piece of stiff cardboard 12 inches wide and 36 inches long
- Tape
- A coin
- An eraser
- A pen
- An ice cube
- A toy car
- Other small objects
- A ruler
- A stop watch
- A chair
- "Friction Observation" Sheet
- A "Friction At Home" Observation Sheet for each student



Background:

The force of friction opposes objects in motion. This means that without friction, a moving object would keep moving at a constant speed and would not stop. Friction occurs wherever two objects touch. The amount of friction is dependent on the nature of the two surfaces that are in contact and the weight of the object we are trying to move. Generally, the rougher the two surfaces are, the more friction there is between them, and the heavier an object is the more friction there will be between the object and surface over which we are trying to move it.

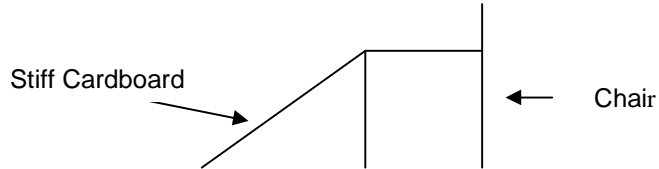
Activity:

1. Divide the students into groups of three.
2. Hand each group a "Friction Observation" worksheet.
3. Give each group a piece of stiff cardboard, a piece of tape, a coin, an eraser, a pen, an ice cube, a toy car, a ruler and a stopwatch. (You may hand the students other small objects as well.)

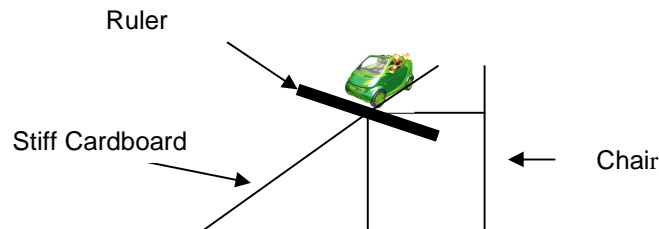


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4. Take the piece of cardboard and rest it on a chair so that one end is raised and the other end is on the floor. Tape the top edge of the cardboard to the chair.



5. Have the students predict which object they think will move most quickly down the ramp and why.
6. Place each of the objects on the ramp at the raised end. Hold the ruler in front of the object as a barrier to keep the object from falling.



7. Take the ruler away. Have the students' record the time it took the object to fall.
8. Have the students create a bar graph illustrating their data.
9. Have the students write a conclusion based on what they observed. Make sure they discuss whether their initial prediction was correct or not.

Extensions:

1. Have your students find other surfaces and repeat the experiment.
2. Use the "Friction at Home" worksheet and have your students look for examples of friction when they go home.



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Friction Observation

Names:

Prediction:

Observations:

Object	Time	Ranking
Coin		
Eraser		
Ice Cube		
Toy Car		
Pen		

Conclusion:



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Friction At Home

1. List three examples of how friction affects your life at home.

a.

b.

c.

2. In each example, what two things are rubbing together?

a.

b.

c.



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3. In each case, is friction helping to get something done or is it making the work harder? How?

a.

b.

c.

4. In each case, what could you do to either increase or decrease the amount of friction?

a.

b.

c.



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5. For each example, describe another similar case in which friction might work the same way?

a.

b.

c.



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